भारतीय मानक
Indian Standard

IS 1883 : 2020

धातु की खांचे वाली रैक (समायोज्य प्रकार) — विशिष्टि

(चौथा पुनरीक्षण)

Metal Shelving Racks (Adjustable Type) — Specification

(Fourth Revision)

ICS 97.140

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भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली – 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI-110002
www.bis.gov.in www.standardsbis.in

December 2020 **Price Group 5**

Furniture Sectional Committee, CED 35

FOREWORD

This Indian Standard (Fourth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Furniture Sectional Committee had been approved by the Civil Engineering Division Council.

This standard was first published in 1961 and subsequently revised in 1966, 1975 and 1983. In this revision, the following modifications have been carried out:

a) Reference standards for raw materials have been updated;
b) Provision for use of powder coating has been added;
c) Provisions relating to tolerances have been modified; and
d) Provisions for marking have been updated.

The composition of the Committee responsible for the in the formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

METAL SHELVING RACKS (ADJUSTABLE TYPE) — SPECIFICATION

(Fourth Revision)

1 SCOPE

This standard covers the requirements for adjustable metal shelving racks.

2 REFERENCES

The standards listed in Annex A contains provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standard indicated at Annex A.

3 MATERIALS

3.1 Angles

Mild steel for hot rolled angle sections shall conform to IS 15911. Hot rolled mild steel angle shall conform to IS 808. Angle and channel sections may also be cold formed from strip steel, conforming to IS 513 (Part 1).

3.2 Bolts and Screws

Bolts and screws used for assembly shall not be less than M6 size. Square or hexagonal nuts and bolts shall conform to IS 2585 and IS 1363 (Parts 1 to 3), respectively. The bolts, screws and nuts shall be zinc plated or galvanized in accordance with IS 1573 or IS 1367 (Part 13).

3.3 Block Boards

Shall conform to MR Grade of IS 1659.

3.4 Fibre Hardboards

Shall be of tempered type conforming to IS 1658.

3.5 Medium Density Fibre Boards (MDF)

MDF shall conform to IS 12406.

3.6 Steel Sheets

Steel sheets shall conform to grade HR1 of IS 1079 or grade CR1 of IS 513 (Part 1).

3.7 Plywood

Plywood used in the manufacture shall conform to IS 303. Any of the two grades namely, BWR and MR of plywood may be used for items which are to be finished with air drying paints, enamel or varnishes. Where items are finished with oven drying paints, enamel or varnishes, only BWR grade of plywood shall be used. In case veneered plywood is used it shall conform to IS 1328.

3.8 Veneered Particle Boards

Veneered particle boards shall conform to IS 3097. Both grades of veneered particle boards can be used where the furniture items are to be finished with air drying paints or varnishes. Where oven baking paints, enamel or varnishes are to be used, only exterior grade veneered particle boards shall be used.

3.9 Particle Boards

Wood particle boards required for the manufacture of various items of furniture shall conform to IS 3087 and shall be of type FPS or FPT-1, that is, flat pressed singlelayer board or flat pressed three-layer board.

4 TYPES

Metal shelving racks shall be of three types namely, open type, semi open type and closed type.

4.1 Open Type

Racks without side and back sheets. A typical arrangement of open type metal shelving racks is given in Fig. 1

4.2 Semi-open Type

Racks with sides only and no back, or racks with back only and no sides.

4.3 Closed Type

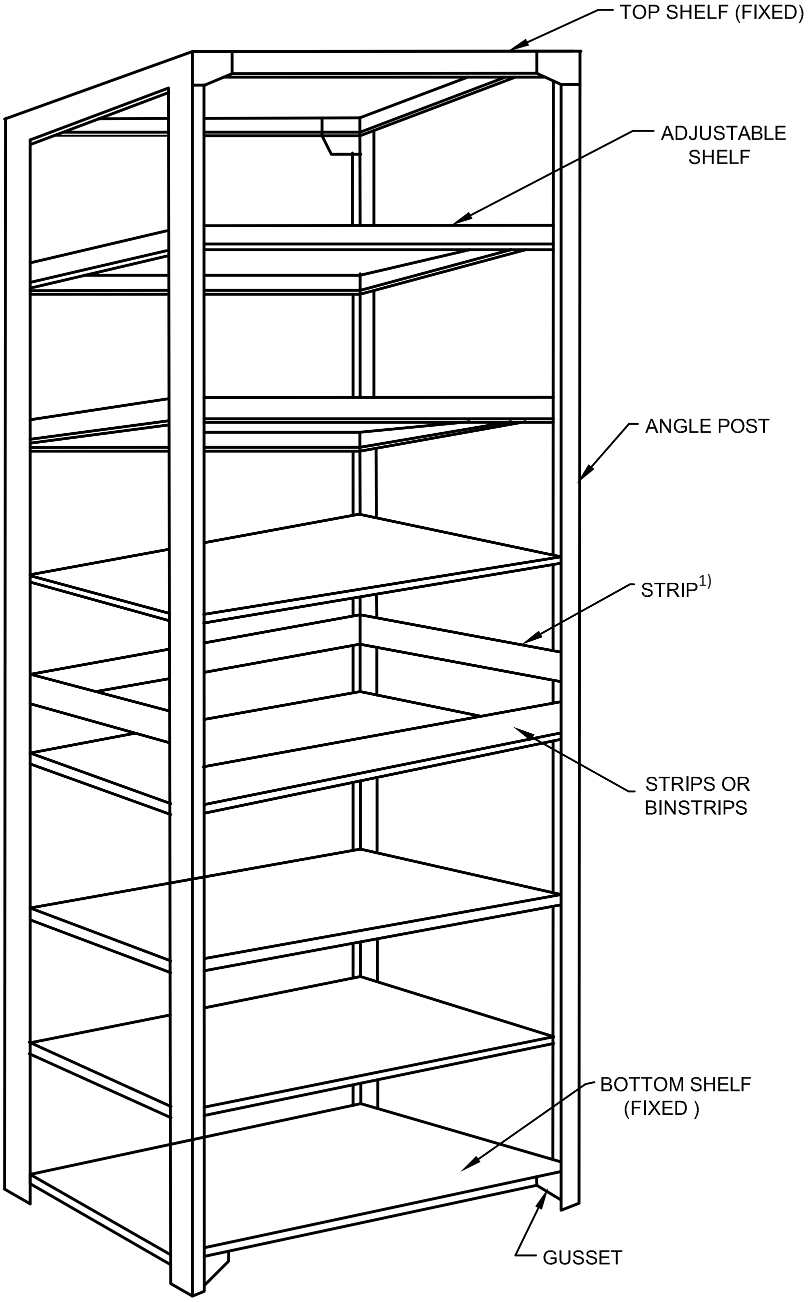
Racks fitted with side and back sheets.

5 DIMENSIONS AND TOLERANCES

5.1 Dimensions

The nominal overall dimensions of both the types of shelving racks shall be as given below:

a) Height :	975 to 4 875 mm; in increments of 300 mm
b) Width :	900 mm
c) Depth :	300, 400, 500 and 600 mm
d) Ground clearance :	45 mm



[1] Arrangement for Fitting Strips Shown in One Opening Only.

FIG. 1 TYPICAL ARRANGEMENT OF OPEN TYPE METAL SHELVING RACK

NOTE — Minimum clearance required for such shelving racks as may be put into recesses or openings shall be as follows:

a) For top of rack	:	20 mm
b) For each side of rack	:	10 mm
c) For depth of rack	:	5 mm

5.2 Tolerances

The dimensions specified in **5.1** shall not vary by more than ±10 mm.

6 FABRICATION

6.1 Components

Metal shelving racks shall be assembled from the components given in **6.2** to **6.11.**

6.2 Angle Posts

The length of angle posts shall correspond to height of racks (*see* **5.1**). The thickness of post when made from steel sheet shall be not less than 3 mm. Rolled steel angle posts shall be of 40 mm × mm 40 × 3 mm size. Angle posts shall be free from twist, sharp edges and burrs. Suitable plastic or rubber pads may be provided at the bottom of each angle post if required by the purchaser.

6.2.1 *Holes in Angle Posts*

Angle posts shall have 8mm diameter holes provided at 50 mm centres. The holes shall start at 12.5 mm centres from each end.

6.3 Shelves

6.3.1 *Metal Shelves*

Metal shelves shall be made from mild steel sheets not less than 0.8 mm in thickness. Shelves shall have lipped flanges width of flange being 30 mm and depth of lip 8 mm. The size of shelves shall be derived from the dimensions of racks given in **5.1** and the thickness of angles, gussets and sheets where used.

6.3.2 *Wood Based Panel Shelves*

Shelves may be made from wood particle boards, veneered particle boards, blockboards or plywood not less than 20 mm in thickness with four brackets fixed on the end sides near the corners (*see* Fig. 2). The brackets shall be made of steel sheeting not less than 1.6 mm thick and shall have 8 mm corresponding holes for fixing them to the angle posts.

6.3.3 *Holes in Shelves*

Shelves shall have 8 mm corresponding holes for fixing them to the angle posts. In addition shelves shall have 5 mm holes for corner gussets and for fitting backs and sides, where necessary. Where partitions have to be fixed, the shelves shall have additional 8 mm diameter holes provided at 50 mm centres.

6.4 Gussets

Minimum 8 gussets, four on each face shall be fitted to the open type racks, that is without sides and back or racks with sides only (*see* Fig. 1). Gussets to sides may also be provided to give greater rigidity and prevent the racks from becoming out of square. Four gussets on front face shall be fitted to closed type racks, that is, racks fitted with sides and back or racks with back only. Gussets shall be made of 1.0 mm (minimum) thick mild steel sheet and shall be not less than 75 mm long at each end jointing to the shelf and angle post.

6.5 Sides

6.5.1 *Metal Sides*

The sides shall be made from mild steel sheets not less than 0.8 mm thick. The width of the side sheets shall correspond to the depth of the shelf as given in **6.3.1** but shall be less by 12.5 mm. The sides shall extend between the extreme surfaces of top and bottom shelves but shall stop 50 mm from the floor level.

6.5.2 *Wood Based Panel Sides*

The sides may be made from wood particle boards, veneered wood particle boards, hardboards or plywood not less than 10 mm in thickness.

6.5.3 *Holes in Sides*

Holes of 8 mm in diameter shall be provided along each longitudinal edge and shall be spaced at 50 mm centres and shall match with the holes in the corresponding vertical angle posts.

6.6 Backs

6.6.1 *Metal Backs*

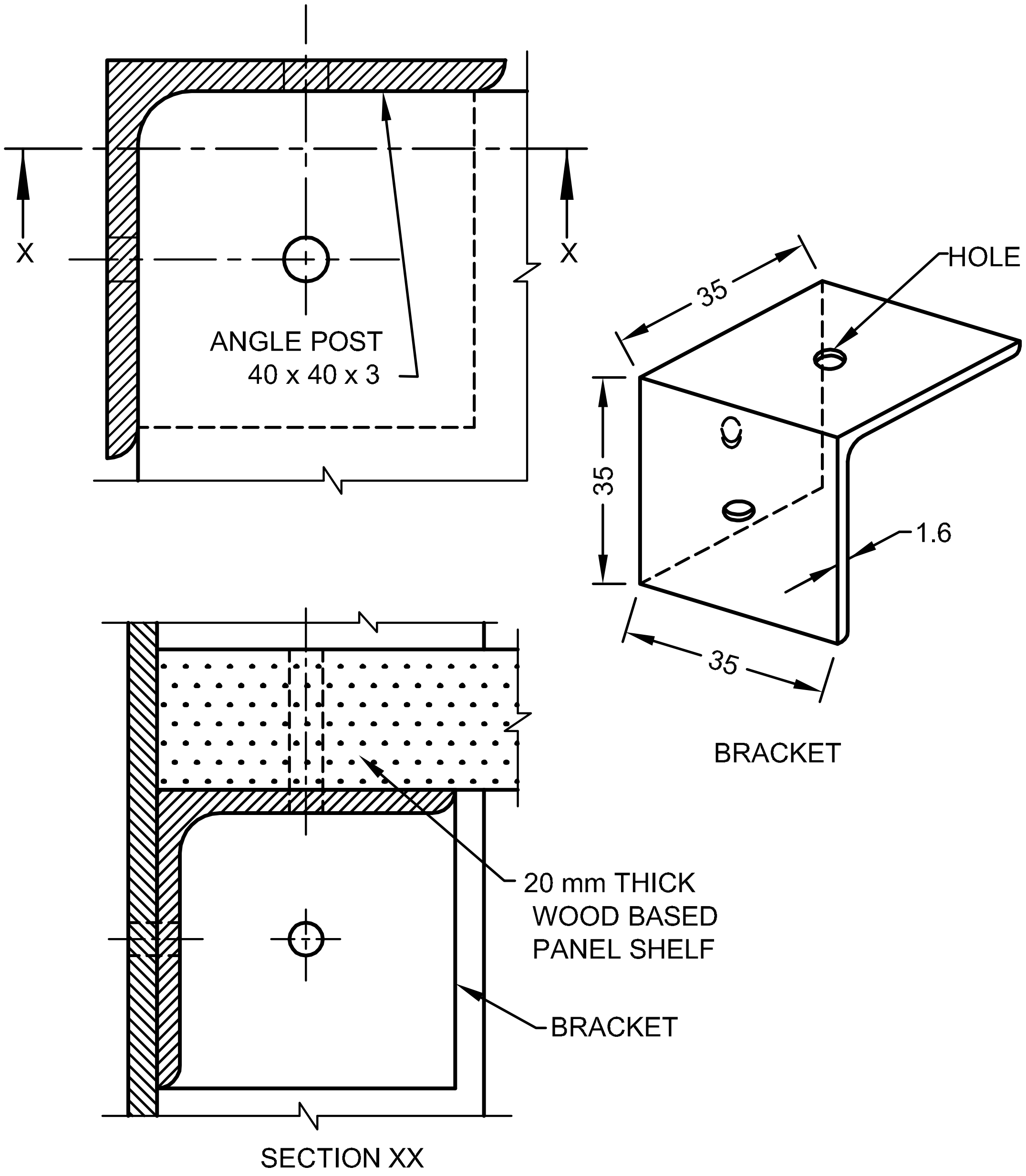
The backs shall be made from mild steel sheets not less than 1.0 mm thick. The width of back sheet shall correspond to the width of the shelf as in **6.3.1** but shall be less by 12.5 mm. The backs shall extend between the extreme surfaces of the top and bottom shelves but shall stop 50 mm from the floor level.

6.6.2 *Wood Based Panel Backs*

The back may be made from wood particle boards, veneered wood particle boards, hardboards or plywood not less than 10 mm in thickness.

6.6.3 The requirements of **6.5.3** for sides shall apply the backs also. In addition there shall be a row of holes 8 mm in diameter in the middle of backs, so as to permit fixing back to the shelves. Corresponding holes shall be provided in the shelves.

6.7 Partitions, if provided to divide the compartment into pigeon holes, shall be made from mild steel sheets not less than 0.8 mm thick. Partitions shall be fixed



All dimensions in millimetres.

Fig. 2 Arrangementfor Fixingof Wood Based Panel Shelves

to shelf by four bolts and nuts (*see* Fig. 3). Where partitions are fitted one over the other, a common bolt shall hold both the partitionswith the shelf.

6.8 Strips

For open type of shelving rack, strips may be provided on the sides and back to prevent materials from toppling over. They shall be made from mild steel sheet not less than 1.0 mm thick and 25 mm, 50 mm or 75 mm, in height. The longitudinal ends of the strips shall be bent and pressed over to form a knife edge (*see* Fig. 3).

6.9 Binstrips

Binstrips may be provided on the front face only when the racks are covered on the sides and back. They shall be made from mild steel sheet not less than 0.8 mm thick and shall measure 25 mm, 50 mm, 75 mm or 100 mm in height over the top surface of the shelf.

6.10 Label Holders

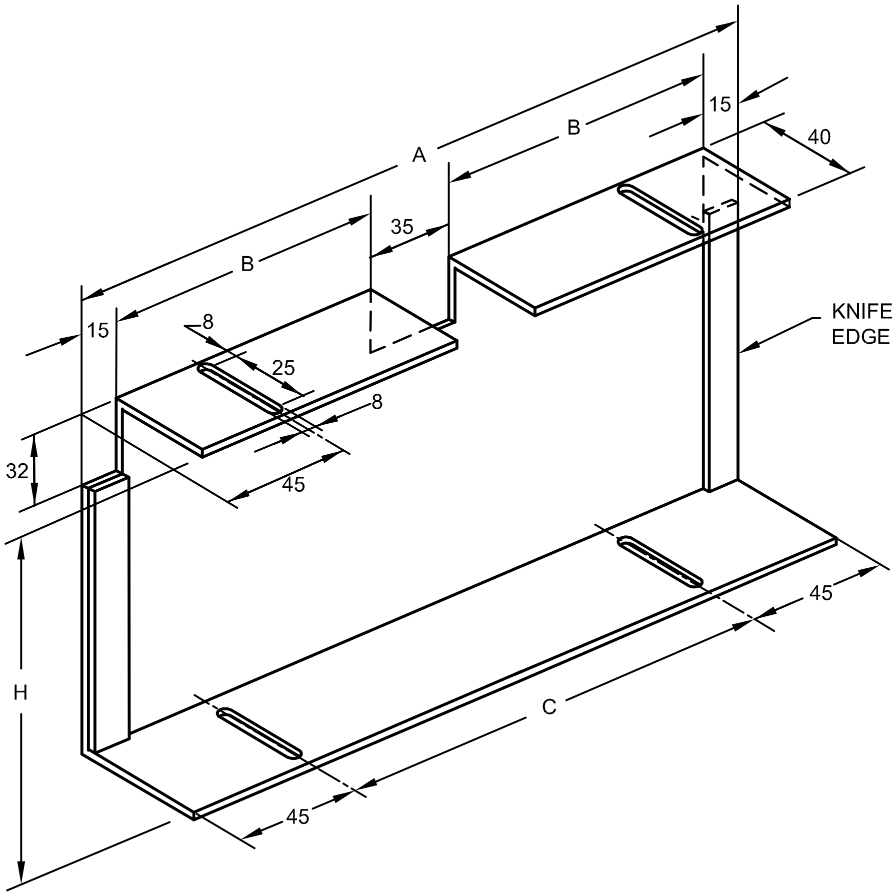
Label holders shall be fitted on the front flange of the shelf and shall be 25 mm high.

6.11 Reinforcements and Side Supports

In order to accommodate the requirements for varying types of load, shelf reinforcement and side support may be used.

7 ASSEMBLY

The various components shall be assembled by means of bolting.



NOTES

1 Dimension *A* is the nominal depth of rack as in 5.1 minus 10 mm, the overall height *H* of B partition shall be 3 mm less than the centre to centre dimension between the shelves.

2 Dimension $B = \frac{A-35}{2}$ mm.

3 Dimension *C* = depth of shelf - 100 mm.

4 35 mm wide opening in the upper flange of partition shall only be provided when the shelves are fitted with a stiffener in the middle underneath. Depth of the opening shall be sufficient to accommodate the stiffener.

All dimensions in millimetres.

FIG. 3 PARTITION

8 FINISH

8.1 Angles and Sheet Metal Components

8.1.1 All dents, burrs and sharp edges shall be removed from the various components. The components shall be individually pickled, scrubbed and rinsed to remove grease, rust, scale or any other foreign element.

8.1.2 Immediately after pickling, all the mild steel parts shall be given phosphating treatment conforming the Class C of IS 3618. The process for application of phosphate coating shall be in accordance with IS 6005.

NOTE — Putty shall be applied to all the surfaces requiring tilling and shall conform to IS 110. Primer shall conform to IS 11883.

8.1.3 Coat/coats of enamel paint shall then be applied as follows:

a) Finish coat with enamels shall conform to IS 151 and IS 2932 (Part 1) or IS 2933 (Part 1),

b) In case of stoving enamel the components shall thereafter be baked at a specified temperature in an oven heated uniformly. The finish shall be smooth and uniform with a hard and tough film of enamel strongly adhering to the surface. The finish shall be free from all visible defects and shall not chip when tapped lightly with a dull pointed instrument.

c) Powder coatings shall conform to IS 13871.

8.2 Wood Based Panel Components

These components may either be painted or polished.

8.2.1 Wood putty conforming to IS 419 shall be applied to all wood based surfaces requiring filling, followed by a suitable primer paint before the finishing coat of paint is applied [*see* IS 2338 (Part 1)].

8.2.2 Wood based panels may be polished either with transparent glossy polish or stained dark polish.

8.3 All other components shall be finished in colour as agreed to between the purchaser and the manufacturer.

9 PERFORMANCE REQUIREMENTS OF FINISH

9.1 Scratch Hardness Test — Test shall be carried out as per IS 101 (Part 5/Sec 2).

9.2 Pressure Test — Test shall be carried out as per IS 101 (Part 5/Sec 1).

9.3 Flexibility and Adhesion Test — Test shall be carried out as per IS 101(Part 5/Sec 2).

9.4 Stripping Test — Test shall be carried out as per Annex C of IS 9862.

9.5 Test for Protection Against Corrosion Under Conditions of Condensation — Test shall be carried out as per IS 101 (Part 6/Sec 1).

10 LOADING

The maximum static load uniformly distributed and applied on the shelves may not exceed 150 kg. The load may be taken as a guide in ordering shelves.

11 SAMPLING AND CRITERIA FOR CONFORMITY

11.1 All the racks of same size and type manufactured under similar condition of production shall constitute a lot.

11.2 The number of racks to be selected from a lot shall depend upon the size of the lot and shall be in accordance with Table 1.

11.3 The required number of racks for testing shall be selected at random. To ensure the randomness of selection, procedures given in IS 4905 may be followed.

Table 1 Size of Sampling for Racks

(*Clause* 11.2)

Sl No. (1)	Lot Size (2)	Sample Size (3)
i)	Up to 25	3
ii)	26 to 50	4
iii)	51 to 100	5
iv)	101 to 150	7
v)	151 to 300	10
vi)	301 and above	15

12 ACCEPTANCE CRITERIA

12.1 The sample lot shall meet the dimension and tolerance requirements given in **5.**

12.2 The sample lot shall meet the finish requirements given in **8** and **9.**

12.3 The sample lot shall meet the loading requirements given in **10.**

13 INFORMATION TO BE SUPPLIED BY THE PURCHASER

The purchaser shall supply along with his order the following information to the supplier:

a) Number of steel shelving racks;

b) Type of racks (open, semi-open or closed);

c) Size of rack (*see* **5.1**);
d) Number of shelves;
e) If partitions are required, the number of compartments required in height and height of the individual compartments (centre-to-centre of adjacent shelves);
f) Number and location of partitions in each compartment, where required;
g) Whether binstrips are required for each compartment;
h) Whether label holders are required for each compartment, if so specify width;
j) Colour required; and
k) If open, number and location of strips.

14 PACKING

All angIes, shelves, gussets, sides, partitions, backs, bolts and nuts shall be suitably packed in such a way so as not to be damaged during transit.

15 MARKING

15.1 Metal racks and its packing shall be legibly and indelibly marked with the following:

a) Manufacturer's name or trade-mark, if any;
b) Address of the manufacturer;
c) Brand name;
d) Lot/Batch/Serial Number; and
e) Date of Manufacturing.

15.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act,* 2016 and the Rules and Regulations framed there under, and the product(s) may be marked with the Standard Mark.

ANNEXA

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
101	Methods of sampling and test for paints, varnishes and related products
(Part 5/ Sec 1) : 1988	Mechanical test on paint films, Section 1 Hardness tests (*third revision*)
(Part 5/ Sec 2) : 1988	Mechanical test on paint films, Section 2 Flexibility and adhesion (*third revision*)
(Part 6/ Sec 1): 1988	Durability tests, Section 1 Resistance to humidity under conditions of condensation (*third revision*)
110 : 2017	Ready mixed pint, brushing, grey filler, for enamels for use over primers — Specification (*third revision*)
151 : 2017	Ready mixed paint, spraying, finishing, stoving, enamel, for general purposes, colour as required —Specification (*second revision*)
303 : 1989	Plywood for general purposes (*third revision*)
419 : 1967	Putty, for use on window frames (*first revision*)
513 (Part 1) : 2016	Cold reduced low carbon steel sheets and strips(*sixth revision*)
808 : 1989	Dimensions for hot rolled steel beam, column, channel and angle sections (*third revision*)
1079 : 2017	Hot rolled carbon steel sheet and strip — Specification (*seventh revision*)
1328 : 1996	Veneered decorative plywood — Specification (*third revision*)
1363	Hexagon head bolts, screws and nuts of product grade `C’
(Part 1) : 2019	Hexagon head bolts (size range M 5 to M 64) (*fifth revision)*
(Part 2) : 2018	Hexagon head screws (size range M 5 to M 64) (*fifth revision*)
(Part 3) : 2018	Hexagon nuts (size range M 5 to M 64) (*fifth revision*)
1367 (Part 13) : 1983	Technical supply conditions for threaded steel fasteners: Part 13 Hot-dip galvanized coatings on threaded fasteners (*second revision*)
13871 : 1993	Powder coatings — Specification
1573 : 1986	Specification for electroplated coatings of zinc on iron and steel (*second revision*)
1658 : 2006	Fibre hardboards — Specification (*third revision*)
1659 : 2004	Block boards — Specification (*fourth revision*)
2062 : 2011	Hot rolled medium and high tensile structural steel (*seventh revision*)
2338 (Part 1) : 1967	Code of practice for finishing of wood and wood based materials: Part 1 Operations and workmanship
2585 : 2006	Square head bolts, screws and square nuts of product grade C — Specification (*second revision*)
2932 (Part 1) : 2013	Enamel, synthetic, exterior : (a) undercoating (b) finishing — Specification: Part 1 for Domestic and decorative applications (*fourth revision*)
2933 (Part 1) : 2013	Enamel, exterior : (a) undercoating (b) finishing — Specification: Part 1 for Domestic and decorative applications (*second revision*)
3087 : 2005	Practicle boards of wood and other lingnocellulosic materials (medium density) for general purposes — Specification (*second revision*)
3097 : 2006	Veneered particle boards — Specification (*second revision*)
3618 : 1966	Phosphate treatment of iron and steel for protection against corrosion
4905 : 2015	Random sampling and randomization procedures (*first revision*)
6005 : 1998	Code of practice for phosphating of iron and steel (*first revision*)
9862 : 2017	Specification for ready mixed paint, brushing,bituminous, black, acid, alkali, water and chemical resisting (*first revision*)
11883 : 2017	Ready mixed paint, brushing, red oxide, priming for metals — Specification (*first revision*)
12406 : 2003	Medium density fibreboards for general purpose — Specification (*first revision*)
13871 : 1993	Powder coating — Specification

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Furniture Sectional Committee, CED 35

Organization	*Representative(s)*
In Personal Capacity (*Pratap Nursery Lane Near Gurudwara Sahib, Panditwari, Dehradun*)	Shri K. S. Pruthi (***Chairman***)
Association of Furniture Manufacturers and Traders (I), Mumbai	Representative
Blowplast (BP) Ergonomics Ltd, Mumbai	Dr Nitin Sudame Dr Gita Piramal (*Alternate*)
Central Public Works Department, New Delhi	Shri Rajesh Kumar Dhiman Shri Arun Kumar Tyagi (*Alternate*)
Centre for Environmental Planning and Technology (CEPT)University, Ahmedabad	Prof Shrutie Tamboli Prof Snehal Nagarsheth (*Alternate*)
CSIR - Central Building Research Institute, Roorkee	Shri S. K. Negi Shri Ashok Kumar (*Alternate*)
Directorate of Education, Delhi	Representative
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Indian Furniture Products Ltd (Zuari), Tiruvallur	Shri C. M. Satheesh Kumar Shri S. Saravanan (*Alternate*)
Indian Stainless Steel Development, Gurugram	Shri Rohit Kumar Shri Jousline George (*Alternate*)
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School of Planning & Architecture, New Delhi	Prof Manoj Mathur Prof Aruna Ramani Grover (*Alternate*)
The Indian Institute of Architects, Mumbai	Ar Vikramray Pramodray Pandya

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BIS Directorate General	SHRI SANJAY PANT, SCIENTIST 'F' AND HEAD (CIVIL ENGINEERING) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

Member Secretary

SHRI ABHISHEK PAL

SCIENTIST 'C' (CIVIL ENGINEERING), BIS

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices:		*Telephones*
Central	Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	2323 7617 2323 3841
Eastern	1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi KOLKATA 700054	2337 8499, 2337 8561 2337 8626, 2337 9120
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